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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/765,608	01/22/2001	Yoshinori Hayashi	202114US2	9741

22850   7590   02/21/2003

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EXAMINER
PHAM, HAI CHI

ART UNIT	PAPER NUMBER
2861	

DATE MAILED: 02/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.		Applicant(s)	
Office Action Summary	09/765,608		HAYASHI ET AL.	
	Examiner		**Art Unit**	
	Hai C Pham		2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _26 December 2002_ .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-8_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-8_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _25 November 2002_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

        1.☒ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____ .

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _13,16,17_ .

4)☐ Interview Summary (PTO-413) Paper No(s). _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Frazier et al. (U.S. 5,193,008) in view of Itoh et al. (U.S. 5,412,408).

Frazier et al. discloses an interleaving vertical pixel formation in a laser printer

such that a dot is formed at a center between adjacent light fluxes as a result of the

adjacent light fluxes being overlapped with one another in a sub-scan direction (the

image dots between the scan lines being achieved by energizing two pixels directly

above and directly below the desired interleaved dot with the energizations at both

pixels being below the threshold level for producing a dot while the combined

energization at the desired interleaved dot is higher than the threshold such that the

desired interleaved dot is printed) (col. 3, line 43 to col. 4, line 41).

Frazier et al. further teaches such laser printer including a photoconductive drum

(not shown) along with a laser source (not shown) for emitting the light flux to scan the

surface of the photoconductive drum to form the latent image, but Frazier et al. does not

show the deflector, which is an inherent component of a raster-based laser printer

taught by Frazier et al.

However, Frazier et al. fails to teach the relationship between the beam-spot diameter Ws in the sub-scan direction and the interval L between adjacent scan lines.

Regardless, Itoh et al. discloses an image recording apparatus comprising a photosensitive body (54), an optical scanning device having a deflector (52) for deflecting a light flux emitted from a light source (51), and for scanning the surface of the photosensitive body by the thus-deflected light flux, the apparatus being configured such that a dot is formed at a center between adjacent light fluxes as a result of the adjacent light fluxes being overlapped with one another in a sub-scanning direction (Itoh et al. indicates in Fig. 8 that the dot formed at the center between two adjacent scanning lines being formed at the overlapping between a "dot ON' and a "dot OFF" on a preceding scan line at the position above the "dot ON" with the laser beam intensity for "dot ON" being set at a certain recording threshold level, e.g., recording level A, and further teaches the case where all the surrounding dots being ON, such as dots p2-p9 being all ON such that the center dot is formed as a result of overlapping the central dot of p1 with a dot at the position on a preceding scan line above the dot p1 and the laser beam intensity being set at a level C) (col. 6, lines 31-54). Itoh et al. further teaches a ratio of a static beam-spot diameter (d) in the sub-scan direction on the surface of the photosensitive body defined by $1/e^2$ of the maximum value in the exposure distribution of the beam spot to an interval (p) between adjacent scan lines being:

$2.0 \leq d/p$ (col. 5, lines 16-25)

Itoh et al. thus suggests that an interleaved dot can be effectively produced with the above ratio set at 2.0, a value well within the claimed range.

On the other hand, Frazier et al. suggests that the laser beam can be oval in area (col. 1, lines 49-50), but does not explicitly define the laser beam diameter taken at $1/e^2$ of the maximum value in the exposure distribution of the beam spot. However, Itoh et al. teaches the shape of the light beam being an ellipse, and the above mentioned beam diameter d in the sub-scan direction being defined as the longer diameter of the ellipse. Therefore, the following formula holds:

$$d_m / d_s < 1$$

where d_m is the static beam-spot in the main scan direction, and

d_s (=d) the static beam-spot in the sub-scan direction (col. 5, lines 26-30).

Since both Frazier et al. and Itoh et al. are concerned in providing a high density image of high quality without increasing cost, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Frazier et al. with the aforementioned teachings of Itoh et al. By doing so, it is possible to increase the potential contrast of the interleaved dot on the photoconductor as well as to increase the resolution of the reproduced image without increasing cost.

Method claims 5 and 6 are deemed to be clearly anticipated by the functions of the above structures.

Response to Arguments

3.   Applicant's arguments with respect to claims 1-8 have been considered, and are traversed in view of the new grounds of rejection presented in this Office action.

With regard to the claimed inequality of the ratio of the beam-spot diameter Ws in the sub-scan direction to the interval L between adjacent scan lines:

$1.2 < Ws/L < 4.5$

Itoh et al. teaches a preferred value for the ratio to be $Ws/L \geq 2.0$, with the value of 2.0 being inclusive, and thus teaches the laser beam having a condition that meets the claimed requirement.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (703) 308-1281. The examiner can normally be reached on T-F (8:30-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin R. Fuller can be reached on (703) 308-0079. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722, (703) 308-7724, (703) 308-7382, (703) 305-3431, (703) 305-3432 for regular communications and for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

HAI PHAM
PRIMARY EXAMINER

February 14, 2003